



COBALT

National Aeronautics and
Space Administration



CoOperative Blending of Autonomous Landing Technology

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HAT: TA: TRL: start 4 / current 4

OVERVIEW

The COBALT project is a flight demonstration of two NASA ALHAT (Autonomous precision Landing and Hazard Avoidance Technology) capabilities that are key for future robotic or human landing GN&C (Guidance, Navigation and Control) systems. The COBALT payload integrates the Navigation Doppler Lidar (NDL) for ultra-precise velocity and range measurements with the Lander Vision System (LVS) for Terrain Relative Navigation (TRN) position estimates. Terrestrial flight tests of the COBALT payload in an open-loop and closed-loop GN&C configuration will be conducted onboard a commercial, rocket-propulsive Vertical Test Bed (VTB) at a test range in Mojave, CA.

INNOVATION

- Further develops a NASA precision landing system for future science and human landing missions
- Operates ALHAT in flight profiles closer to Mars/Moon descent (target: 1-2 km altitude and 25+ m/s velocity)
- Tests an ALHAT capability (TRN+NDL) not implemented on or achievable with Morpheus

INFUSION SPACE / EARTH

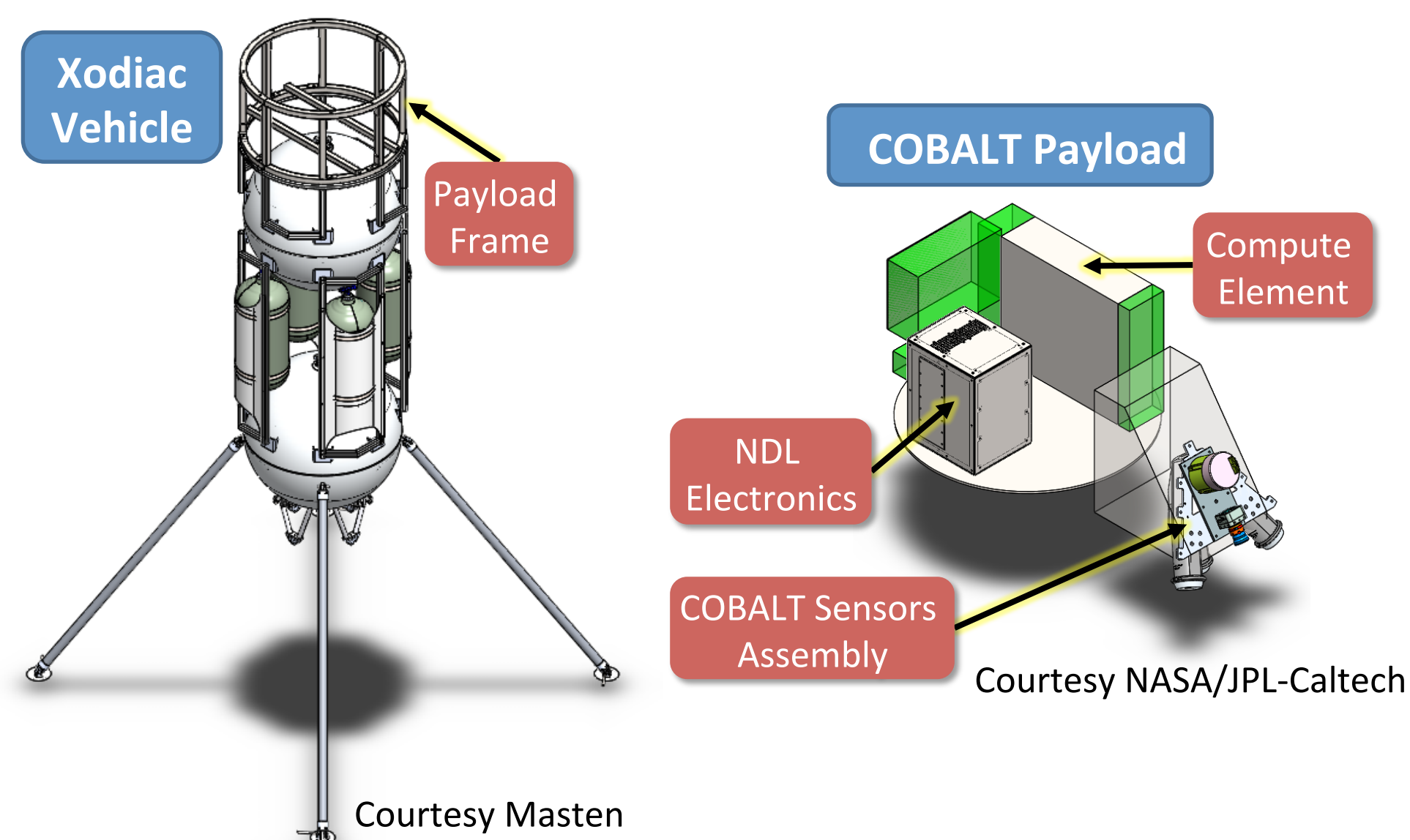
The LVS is a candidate technology for infusion onto Mars 2020. The decision to baseline LVS is imminent.

The NDL is a candidate velocimeter for all missions. No space-qualified COTS velocimeters are available, and the MSL Terminal Descent System (TDS) Doppler radar has high cost, mass and power.

The COBALT project provides infusion opportunities for US commercial space interests in lunar missions. The flight tests will be onboard the Masten Space Systems (MSS) Xodiac VTB, which will provide MSS experience integrating and operating ALHAT capabilities that could be infused onto a future MSS lunar lander.



Courtesy Masten



PARTNERSHIPS / COLLABORATIONS

The COBALT project is a collaboration between multiple NASA centers and NASA directorates. The team is comprised of engineers from JSC, JPL and LaRC. The COBALT payload and NDL ongoing development are funded through the HEOMD AES Program (Lander Technologies Project). The flight campaign will be funded through the STMD Flight Opportunities Program. The LVS technology was previously developed through the SMD Mars Technology Development Program.

FUTURE WORK

The COBALT payload design and implementation is in progress for completion in May 2016. Integrated testing will commence in spring and summer 2016, with open-loop flight tests on the Xodiac vehicle scheduled for August 2016. Closed loop flights will follow in FY2017.

